Consider the following information when a new analyte (test) is added to the laboratory handbook and at scheduled review.

Field	Detail
Test Name (Analyte)	Lead
Alternative Name(s) and Keywords	Pb, BPb
Discipline/Specialty	Biochemistry
Description	Lead is a heavy metal element that is found in trace concentrations in most individuals. Toxicity can occur at very low concentrations in blood.
Clinical Indication	Suspected lead toxicity - symptoms include abdominal pain, fatigue, weakness, anaemia, peripheral neuropathy. Neurological symptoms, seizures and pica behaviours are indications for testing in children. Also screening of lead workers. Industrial/domestic exposure may occur from silver smelting, battery production/burning, paint production/spraying, highway work. Children may be exposed to lead from chipped/flaking paint or paint dust in old housing, in water sources from lead water pipes, from toys that contain lead or lead paint, cookware and glazed lead ceramics and contaminated soil. Pica can be both a cause of increased lead ingestion and a symptom of lead toxicity.
Patient Preparation	None.
Specimen Container	Whole blood (KEDTA) sample required.
Container Image	
Primary Sample Type	Blood
Minimum Volume Required (µL for serum//blood/urine etc. unless otherwise stated)	1.0mL
Special Precautions / Requirements	None

Transport and Storage Requirements	None
Telepath Test Code	BPB
National Pathology Code (READ/SNOMED CT)	
Reference Interval(s)	<0.48µmol/L Non pregnant adults <0.24µmol/L pregnant women and paediatrics (<16y)
Telephone Action Limit(s)	Results of >0.23µmol/L are reportable to PHE (see clinical interpretation below.
Measurement Units	µmol/L
Clinical Interpretation	**Individuals under 16 years old and pregnancy:** From July 2021, the blood lead concentration (BLC) threshold (referred to as the 'public health intervention concentration') at which action is recommended changed. Previously, Public Health England (PHE) used an intervention concentration of ≥10 µg/dL (≥0.48 µmol/L), regardless of age. This intervention concentration was **lowered to ≥5 µg/dL (≥0.24µmol/L) for children under 16 years and pregnant women residing in England.** The concentration was changed for two reasons. Firstly, lead is a non-threshold substance, and at BLCs between 5 and 10 µg/dL (0.24–0.48 µmol/L), there is strong evidence for adverse effects on cognitive function in children, as well as the occurrence of externalising behaviours (for example aggression, hyperactivity), and delay in sexual maturation or puberty onset in adolescence. It is also important to note that there is no evidence of a threshold for lead-induced developmental neurotoxicity in children. For example, BLCs of as low as 0.1 µmol/L have been reported to cause developmental neurotoxicity. There is also evidence for adverse health effects to the foetus from in utero lead exposure at maternal BLC <0.48 µmol/L. Therefore, a precautionary approach to minimise in utero exposures is advised.

	Secondly, children that have a BLC ≥5 µg/dL (≥0.24 µmol/L) are more likely to be exposed to a higher, definable source of lead that can be identified and mitigated, rather than multiple very small exposures that may occur in the wider population. Evidence strongly suggests that high lead exposure in England is associated with multiple facets of inequality, including economic, health, age, and ethnicity dimensions. Therefore, reducing harm from lead exposure in these children is likely to positively impact on these inequalities. **Individuals over 16 years old and non-pregnant:** **The higher threshold of ≥10µg/dL (≥0.48 µmol/L) will still apply to other adults**. Guidelines for exposure in adults: values in µmol/L <0.48 = normal. 0.48–1.4 = indicates exposure. 1.4–2.9 = close monitoring. 2.9–3.4 = close monitoring and remove from exposure immediately. >3.4 = immediately remove from source of lead exposure and may require chelation therapy.
Useful Links / Guidelines	https://www.gov.uk/government/publications/lead-exposure-in-children-surveillance-reports-from-2021/lead-exposure-in-children-surveillance-system-leicss-annual-report-2023
Common Interferences / Causes of Spurious Results	Some sample tube types may be subject to false positive increases in measured values. Please contact the laboratory if sending samples in any containers other than that specified above.
Availability of Clinical Advice	Clinical advice may be obtained from the duty biochemist on 0151 706 4755.
Significant Change Values	n/a
Testing Frequency / Minimum Re-testing Interval	See clinical interpretation section for case specific guidelines.

Related tests	None.
Technology & Analytical Principle Used	Inductively coupled plasma mass spectrometry (ICP-MS) using collision cell.
EQA Scheme	TEQAS (as part of NEQAS)
Laboratory Performed	RLH
UKAS Accreditation Status	LCL (pending)

Form completed by: Hannah Fearon Date: 31/11/2023

Change control completed by: Not required – no changes made.